



# TYNx10 Series

STANDARD

10A SCR

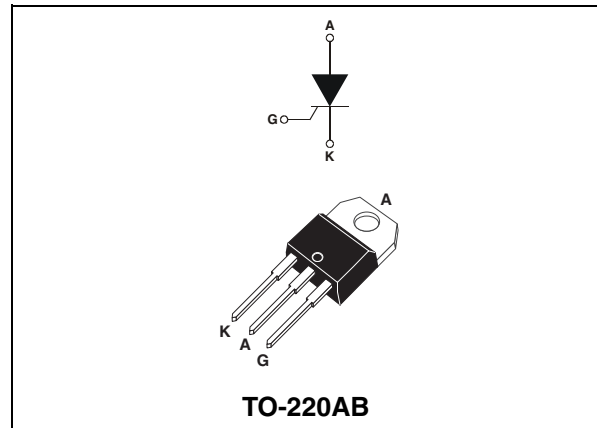
**Table 1: Main Features**

| Symbol            | Value            | Unit |
|-------------------|------------------|------|
| $I_{T(RMS)}$      | 10               | A    |
| $V_{DRM}/V_{RRM}$ | 400, 600 and 800 | V    |
| $I_{GT}$          | 15               | mA   |

## DESCRIPTION

The **TYNx10** Silicon Controlled Rectifiers is a high performance glass passivated technology.

This general purpose Silicon Controlled Rectifiers is designed for power supply up to 400Hz on resistive or inductive load.



**Table 2: Order Codes**

| Part Numbers | Marking |
|--------------|---------|
| TYN410RG     | TYN410  |
| TYN610RG     | TYN610  |
| TYN810RG     | TYN810  |

**Table 3: Absolute Ratings** (limiting values)

| Symbol                 | Parameter                                                                                                   |                           | Value                          | Unit                   |
|------------------------|-------------------------------------------------------------------------------------------------------------|---------------------------|--------------------------------|------------------------|
| $I_{T(RMS)}$           | RMS on-state current (180° conduction angle)                                                                | $T_c = 100^\circ\text{C}$ | 10                             | A                      |
| $I_{T(AV)}$            | Average on-state current (180° conduction angle)                                                            | $T_c = 100^\circ\text{C}$ | 6.4                            | A                      |
| $I_{TSM}$              | Non repetitive surge peak on-state current                                                                  | $t_p = 8.3 \text{ ms}$    | 105                            | A                      |
|                        |                                                                                                             | $t_p = 10 \text{ ms}$     | 100                            |                        |
| $I^2t$                 | $I^2t$ Value for fusing                                                                                     | $t_p = 10 \text{ ms}$     | 50                             | $\text{A}^2\text{s}$   |
| $di/dt$                | Critical rate of rise of on-state current<br>$I_G = 100 \text{ mA}$ , $di_G/dt = 0.1 \text{ A}/\mu\text{s}$ | $T_j = 125^\circ\text{C}$ | 50                             | $\text{A}/\mu\text{s}$ |
| $I_{GM}$               | Peak gate current                                                                                           | $t_p = 20 \mu\text{s}$    | 4                              | A                      |
| $P_{G(AV)}$            | Average gate power dissipation                                                                              | $T_j = 125^\circ\text{C}$ | 1                              | W                      |
| $P_{GM}$               | Maximum gate power                                                                                          | $t_p = 20 \mu\text{s}$    | 10                             | W                      |
| $V_{DRM}$<br>$V_{RRM}$ | Repetitive peak off-state voltage                                                                           | <b>TYN410</b>             | 400                            | V                      |
|                        |                                                                                                             | <b>TYN610</b>             | 600                            |                        |
|                        |                                                                                                             | <b>TYN810</b>             | 800                            |                        |
| $T_{stg}$<br>$T_j$     | Storage junction temperature range<br>Operating junction temperature range                                  |                           | - 40 to + 150<br>- 40 to + 125 | $^\circ\text{C}$       |
| $T_L$                  | Maximum lead temperature for soldering during 10s at 2mm from case                                          |                           | 260                            | $^\circ\text{C}$       |

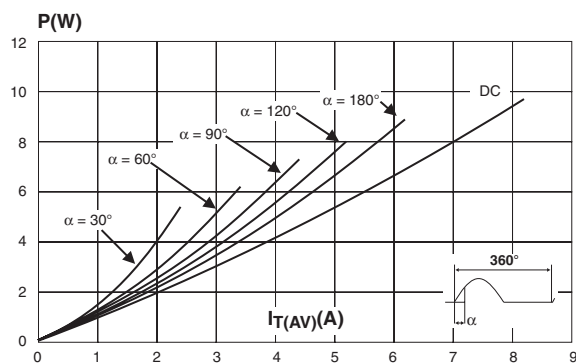
**Tables 4: Electrical Characteristics** ( $T_j = 25^\circ\text{C}$ , unless otherwise specified)

| Symbol                               | Test Conditions                                                                                                                                           |                        |      | Value | Unit |    |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|------|-------|------|----|
| I <sub>GT</sub>                      | V <sub>D</sub> = 12 V (D.C.)    R <sub>L</sub> = 33 Ω                                                                                                     |                        |      | MAX.  | 15   | mA |
| V <sub>GT</sub>                      |                                                                                                                                                           |                        |      | MAX.  | 1.5  | V  |
| V <sub>GD</sub>                      | V <sub>D</sub> = V <sub>DRM</sub> R <sub>L</sub> = 3.3 kΩ                                                                                                 | T <sub>j</sub> = 110°C | MIN. | 0.2   | V    |    |
| t <sub>gt</sub>                      | V <sub>D</sub> = V <sub>DRM</sub> I <sub>G</sub> = 40 mA   dl <sub>G</sub> /dt = 0.5 A/μs                                                                 |                        |      | TYP.  | 2    | μs |
| I <sub>H</sub>                       | I <sub>T</sub> = 100 mA    Gate open                                                                                                                      |                        |      | MAX.  | 30   | mA |
| I <sub>L</sub>                       | I <sub>G</sub> = 1.2 x I <sub>GT</sub>                                                                                                                    |                        |      | TYP.  | 50   | mA |
| dV/dt                                | Linear slope up to:<br>V <sub>D</sub> = 67 % V <sub>DRM</sub> Gate open                                                                                   | T <sub>j</sub> = 110°C | MIN. | 200   | V/μs |    |
| V <sub>TM</sub>                      | I <sub>TM</sub> = 20 A    tp = 380 μs                                                                                                                     |                        |      | MAX.  | 1.6  | V  |
| I <sub>DRM</sub><br>I <sub>RRM</sub> | V <sub>DRM</sub> = V <sub>RRM</sub>                                                                                                                       | T <sub>j</sub> = 25°C  | MAX. | 10    | μA   |    |
|                                      |                                                                                                                                                           | T <sub>j</sub> = 110°C |      | 2     | mA   |    |
| t <sub>q</sub>                       | V <sub>D</sub> = 67 % V <sub>DRM</sub> I <sub>TM</sub> = 20 A    V <sub>R</sub> = 25 V<br>dl <sub>TM</sub> /dt = 30 A/μs    dV <sub>D</sub> /dt = 50 V/μs | T <sub>j</sub> = 110°C | TYP. | 70    | μs   |    |

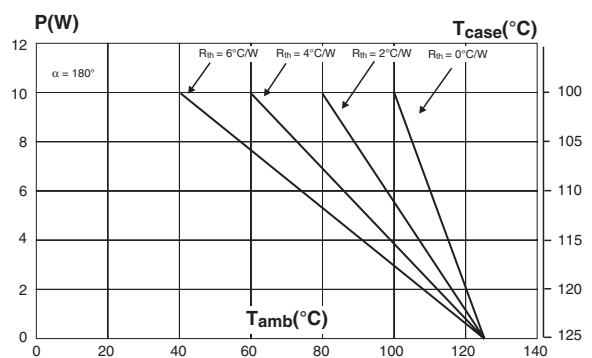
**Table 5: Thermal Resistance**

| Symbol        | Parameter               | Value | Unit                      |
|---------------|-------------------------|-------|---------------------------|
| $R_{th(j-c)}$ | Junction to case (D.C.) | 2.5   | $^\circ\text{C}/\text{W}$ |
| $R_{th(j-a)}$ | Junction to ambient     | 60    | $^\circ\text{C}/\text{W}$ |

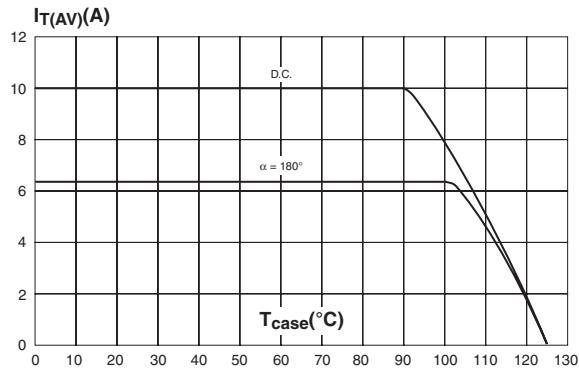
**Figure 1: Maximum average power dissipation versus average on-state current**



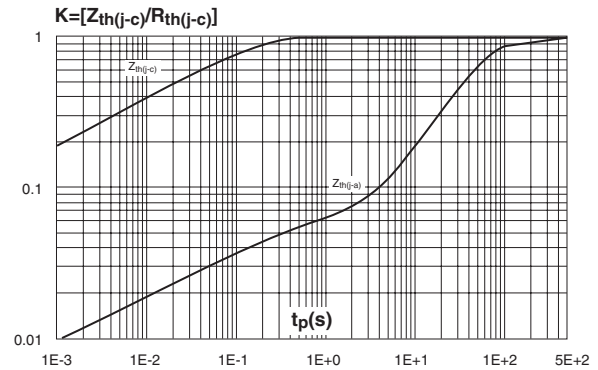
**Figure 2: Correlation between maximum average power dissipation and maximum allowable temperature ( $T_{amb}$  and  $T_{lead}$ )**



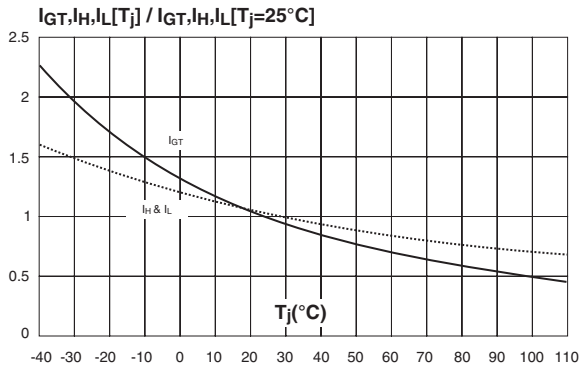
**Figure 3: Average on-state current versus case temperature**



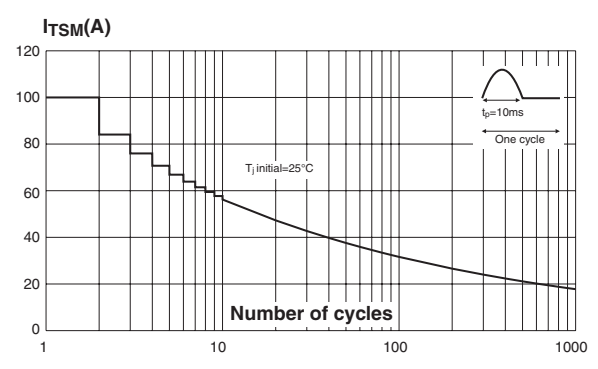
**Figure 4: Relative variation of thermal impedance versus pulse duration**



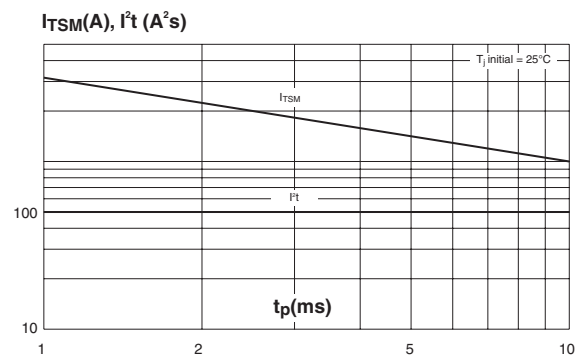
**Figure 5: Relative variation of gate trigger current versus junction temperature**



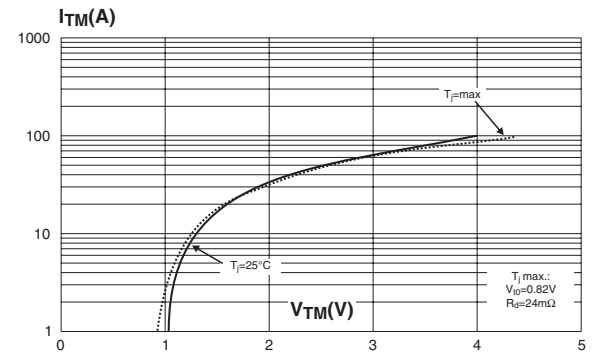
**Figure 6: Surge peak on-state current versus number of cycles**



**Figure 7: Non-repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 10$  ms, and corresponding values of  $I^2t$**

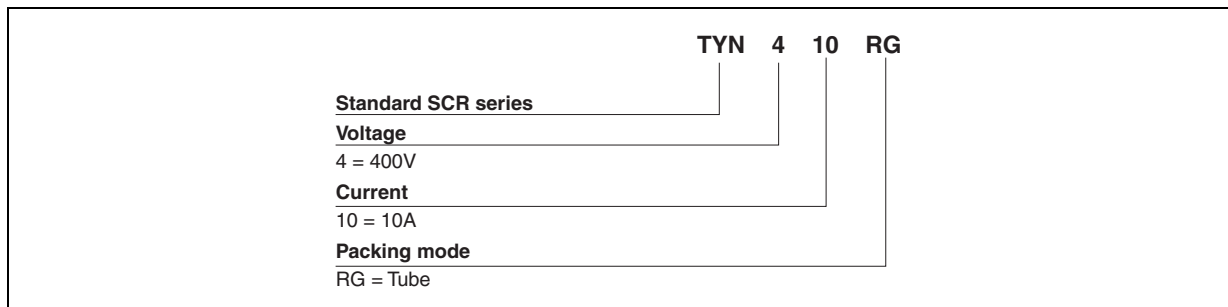


**Figure 8: On-state characteristics (maximum values)**



## TYNx10 Series

**Figure 9: Ordering Information Scheme**



**Table 6: Product Selector**

| Part Numbers | Voltage (xxx) |       |      | Sensitivity | Package  |
|--------------|---------------|-------|------|-------------|----------|
|              | 400 V         | 600 V | 800V |             |          |
| TYN410RG     | X             |       |      | 15 mA       | TO-220AB |
| TYN610RG     |               | X     |      |             |          |
| TYN810RG     |               |       | X    |             |          |

Figure 10: TO-220AB Package Mechanical Data

| REF. | DIMENSIONS  |       |       |        |       |       |
|------|-------------|-------|-------|--------|-------|-------|
|      | Millimeters |       |       | Inches |       |       |
|      | Min.        | Typ.  | Max.  | Min.   | Typ.  | Max.  |
| A    | 15.20       |       | 15.90 | 0.598  |       | 0.625 |
| a1   |             | 3.75  |       |        | 0.147 |       |
| a2   | 13.00       |       | 14.00 | 0.511  |       | 0.551 |
| B    | 10.00       |       | 10.40 | 0.393  |       | 0.409 |
| b1   | 0.61        |       | 0.88  | 0.024  |       | 0.034 |
| b2   | 1.23        |       | 1.32  | 0.048  |       | 0.051 |
| C    | 4.40        |       | 4.60  | 0.173  |       | 0.181 |
| c1   | 0.49        |       | 0.70  | 0.019  |       | 0.027 |
| c2   | 2.40        |       | 2.72  | 0.094  |       | 0.107 |
| e    | 2.40        |       | 2.70  | 0.094  |       | 0.106 |
| F    | 6.20        |       | 6.60  | 0.244  |       | 0.259 |
| ØI   | 3.75        |       | 3.85  | 0.147  |       | 0.151 |
| I4   | 15.80       | 16.40 | 16.80 | 0.622  | 0.646 | 0.661 |
| L    | 2.65        |       | 2.95  | 0.104  |       | 0.116 |
| I2   | 1.14        |       | 1.70  | 0.044  |       | 0.066 |
| I3   | 1.14        |       | 1.70  | 0.044  |       | 0.066 |
| M    |             | 2.60  |       |        | 0.102 |       |

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect . The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: [www.st.com](http://www.st.com).

Table 7: Ordering Information

| Ordering type | Marking | Package  | Weight | Base qty | Delivery mode |
|---------------|---------|----------|--------|----------|---------------|
| TYN410RG      | TYN410  | TO-220AB | 2.3 g  | 50       | Tube          |
| TYN610RG      | TYN610  |          |        |          |               |
| TYN810RG      | TYN810  |          |        |          |               |

Table 8: Revision History

| Date        | Revision | Description of Changes                                                        |
|-------------|----------|-------------------------------------------------------------------------------|
| Sep-2001    | 1A       | First issue.                                                                  |
| 13-Feb-2006 | 2        | TO-220AB delivery mode changed from bulk to tube.<br>ECOPACK statement added. |

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